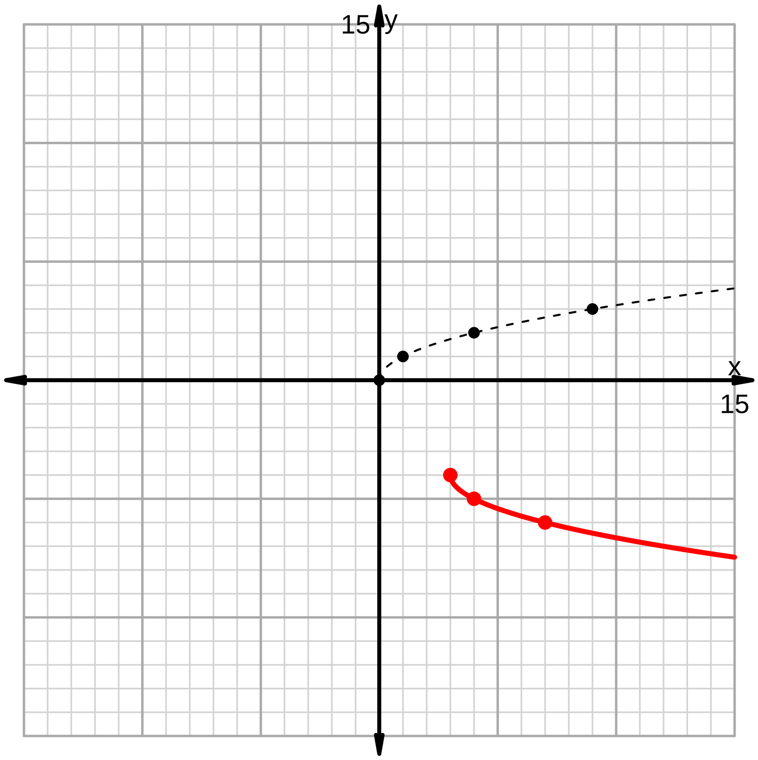
Name: Date:

u10 Radicals, Rationals, and Extraneous Solutions Practice (version 1)

1. Below I've graphed with a dotted curve $y = \sqrt{x}$ with some key points marked with dots. Please draw a graph for $f(x) = -\sqrt{x-3} - 4$, paying close attention to the corresponding key points.



2. State the domain of $y = f(x)$

You can use $x \geq 3$ or $[3, \infty)$ to state the domain.

3. State the range of $y = f(x)$

You can use $y \leq -4$ or $(-\infty, -4]$ to state the range.

4. Find all **extraneous** solutions and **actual** solutions to $-\sqrt{x-3} - 4 = -x + 1$

$$-\sqrt{x-3} - 4 = -x + 1$$

$$-\sqrt{x-3} = -x + 5$$

$$\sqrt{x-3} = x - 5$$

$$x - 3 = x^2 - 10x + 25$$

$$0 = x^2 - 11x + 28$$

$$0 = (x-4)(x-7)$$

So, the possible solutions are $x = 4$ and $x = 7$.
Plug each possible solution into the original equation to check.

Check whether $x = 4$ makes equation true.

$$-\sqrt{(4) - 3} - 4 \stackrel{?}{=} -(4) + 1$$

$$-5 \neq -3$$

Check whether $x = 7$ makes equation true.

$$-\sqrt{(7) - 3} - 4 \stackrel{?}{=} -(7) + 1$$

$$-6 = -6$$

- Actual solution: $x = 7$
- Extraneous solution: $x = 4$

I should say that there is also a graphical approach possible for this problem. If you use it, please explain.

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5. Determine the locations of the x-intercept, the removable discontinuity (the hole), and the y-intercept. Based on those features, sketch the rational function.

$$f(x) \ = \ \frac{x^2 - 7x + 12}{x^2 - 5x + 6}$$

feature	x coord	y coord
x-intercept		
y-intercept		
hole		
vertical asymptote